REMARKS

Allowance of this application is respectfully requested in light of the above amendments and the following remarks.

The specification is amended to correct typographical errors.

Claims 27 and 30 are amended to incorporate subject matter of previous claims 29 and 33. Claims 29, 32-34, 37 and 38 are canceled.

Given that subject matter of previously presented claims is incorporated into claims 27 and 30, no new issues are considered to be presented by these amendments. These amendments were not presented earlier due to the unforeseeability of the new rejections presented in the final rejection. Therefore, entry of these amendments under 37 CFR §1.116 is deemed to be warranted.

Claims 27-32, 37 and 38 stand rejected under 35 USC §103(a) as being unpatentable over Larsson et al. (US 5,956,642) (newly applied) in view of Speight (US 7,480,261) (newly applied) and Parantainen et al. (US 7,092,373). Claims 33 and 34 stand rejected under 35 USC §103(a) as being unpatentable over Larsson et al. (US 5,956,642) (newly applied) in view of Speight (US 7,480,261) (newly applied), Parantainen et al. (US 7,092,373) and Khan (US 2004/0179493). Claims 39 and 40 stand rejected, under 35 USC §103(a), as being unpatentable over Larsson et al. (US 5,956,642) (newly applied) in view of Speight (US 7,480,261) (newly applied), Parantainen et al. (US 7,092,373) and Li et al. (US 2002/0119781). To the extent that these rejections may be applied to the pending claims, the Applicant respectfully traverses these rejections in accordance in accordance with the points set forth below.

Amended claim 27 defines:

> *A base station comprising:*
> *an allocation unit configured to allocate an uplink resource, comprising a frequency resource and a spreading code resource, to be used by a mobile station for transmitting an ACK/NACK signal in response to user data transmitted from the base station to the mobile station;*
> *a generating unit configured to generate transmission power information of the ACK/NACK signal;*
> *an encoding unit configured to jointly encode first allocation information together with the transmission power information and second allocation information to provide control information including the encoded first allocation information, the encoded transmission power information and the encoded second allocation information that are directed to the mobile station, wherein the first allocation information indicates the uplink resource and the second allocation information comprises downlink resource allocation information and indicates a destination of the user data;*
> *a modulating unit configured to modulate the control information; and*
> *a transmitting unit configured to transmit, to the mobile station, the modulated control information including the encoded first allocation information, the encoded transmission power information and the encoded second allocation information to be simultaneously transmitted on a control channel and configured to transmit, to the mobile station, the user data on a user channel.*

Thus, features of the Applicant's claimed invention include *inter alia* (1) an allocation unit configured to allocate an uplink resource, comprising a frequency resource and a spreading code resource, to be used by a mobile station for transmitting an ACK/NACK signal, (2) an encoding unit configured to jointly encode first allocation information together with the transmission power information and second allocation information to provide control information, wherein the first allocation information indicates the uplink resource and the second allocation information comprises downlink resource allocation information and indicates a destination of the user data, and (3) a transmitting unit configured to transmit, to the mobile station, the modulated control information including the encoded first allocation information, the encoded transmission power information and the encoded second allocation information to be

simultaneously transmitted on a control channel and configured to transmit, to the mobile station, the user data on a user channel.

Advantages of this subject matter will be apparent from the following discussion. In the event that one of the transmission power information, the uplink resource allocation and the downlink resource allocation is not successfully received at the mobile station, a retransmission of the user data is necessary. That is, if the second allocation information fails to be received correctly at the mobile station, the mobile station cannot receive the user data because the mobile station cannot recognize the downlink resource or the destination of the user data. In such a case, the mobile station transmits, to the base station, a NACK signal that indicates that the mobile station has not successfully received the user data. Also, if the first allocation information fails to be received correctly at the mobile station, the mobile station cannot transmit the ACK or NACK signal to the base station because the mobile station cannot recognize an uplink resource to be used for transmitting the ACK/NACK signal. Similarly, if the transmission power information is not received correctly, the mobile station cannot transmit the ACK or NACK signal to the base station or cannot transmit the ACK or NACK signal with the appropriate transmission power to the base station because the mobile station does not know what transmission power to be used for transmitting the ACK/NACK signal In such cases, the base station cannot be informed, by the ACK/NACK signal, whether the mobile station has successfully received the user data or not, and the base station must retransmit the user data.

In an environment where an error rate of a single transmission is 5% and a success rate at the single transmission becomes 95%, in a case where the uplink resource allocation, the transmission power information and the downlink resource allocation are separately transmitted, a success rate at which both the uplink resource allocation and the downlink resource allocation

are successfully received at the mobile station is 85.74% (95%×95%×95%) and an error rate at which either one of the uplink resource allocation and the downlink resource allocation failed to be received becomes 14.26%.

On the other hand, in a case where the uplink resource allocation, the transmission power information and the downlink resource allocation are simultaneously transmitted, the success rate at which both the uplink resource allocation, the transmission power information and the downlink resource allocation are successfully received is 95% and the error rate becomes 5%.

Therefore, the instant claimed subject matter, by simultaneously transmitting the encoded first allocation information, the encoded transmission power information and the encoded second allocation information, achieves a significant increase in efficiency by enabling the overall number of retransmissions to be reduced.

The Office Action alleges that Larsson discloses the subject matter of claim 27 of "an uplink resource, comprising a frequency resource and a spreading code resource" by virtue of traffic segments shown in Fig. 2B.

However, Larsson states (col. 8., lines 9-17) that:

> *FIG. 2B illustrates the channel scheme of an exemplary multi-carrier, multi-slot communication scheme, shown generally at 220. The communication scheme is represented graphically and is represented in terms of a time axis 222 and a frequency axis 224. The time axis 222 represents two frames 228, exemplary of a TDMA (time division, multiple access) communication scheme. Each frame 228 is divided into eight time slots, T0-T7.*

From the above, it is apparent that this cited portion of Larsson relates to a TDMA system, and there is no mention of any spreading code resource. Moreover, the only "coding" mentioned in Larsson involves source coding, which involves bit reduction, and channel coding, which relates to forward error correction.

Thus, contrary to the statement in the Office Action, it is apparent that Larsson lacks any teaching or suggestion of the subject matter of claim 27 of "an uplink resource, comprising a frequency resource and a spreading code resource."

With respect to the feature of amended claim 27 directed to jointly encoding first allocation information together with the transmission power information and second allocation information to provide control information, the Office Action cites Larsson's Fig. 8, and proposes that channel coder 866 encodes first allocation information and second allocation information together.

Larsson states (see, col. 18, lines 5-19):

> *Responsive to evaluations made by the evaluator 914, the channel allocator 916 is operable to allocate channels to form the link 815 between the base station 852 and the mobile terminal 854. Channel allocations allocated by the allocator 916 allocate channels which create the downlink as well as the uplink between the base station and mobile terminal. In one embodiment, indications of the channels allocated by the allocator 916 to form the uplink are transmitted upon control channels to the mobile terminal 854. Because the channels are dynamically allocated to form the communication link 815 between the base station 852 and mobile 854 channel allocations of channels to be used to form the link between the base station and mobile terminal are changed, as necessary.*

It is apparent from Fig. 8 of Larsson that the Office Action is incorrect in taking the position that channel coder 866 encodes first allocation information and second allocation information together, since encoder 866 is placed before modulator 868 which receives input from channel allocator 916. Allocator 916 allocates channels which create the uplink as well as the downlink (see col. 18, lines 8-14). That is, allocator 916 generates indications of the allocated channels, and the generated indications are forwarded to modulator 868. However, the indications including downlink and uplink allocation information are not forwarded to encoder 866. Thus, the uplink allocation information and the downlink allocation information are not

encoded together, contrary to the allegation in the Office Action.

Thus, it is apparent that Larsson fails to teach or suggest the subject matter of claim 27 directed to "an encoding unit configured to jointly encode first allocation information together with the transmission power information and second allocation information to provide control information including the encoded first allocation information, the encoded transmission power information and the encoded second allocation information."

The Office Action relies on Speight as teaching simultaneous transmission of first allocation information and second allocation information in physical shared channel allocation message 220. On this point, the Office Action states that Speight discloses a plurality of composite transport channels allocated with a single physical shared channel allocation message, citing col. 2, lines 24-35 and col. 3, lines 32-62.

However, Speight fails to disclose an uplink resource comprising a frequency resource and a spreading code resource, joint encoding of first allocation information for the uplink, second allocation information including a downlink resource allocation and an indication of user data destination, and transmission power information, nor simultaneous transmission of the encoded first allocation information, the encoded transmission power information, and the encoded second allocation information on a control channel. Thus, Speight does not disclose or suggest any of features (1), (2) and (3) of claim 27 cited above.

The Office Action cites Fig. 4 of Parantainen as disclosing a base station that transmits information on an uplink channel used for acknowledgements. However, as noted in the previous response, in Parantainen, the assigned uplink resource for ACK/NACK is comprised of a time slot; see, col. 6, lines 55–64 and col. 7, lines 8-18 which state:

The objectives of the invention are fulfilled by providing a procedure, in which the one

and same uplink control channel is used for transferring uplink control information, that relates to at least two downlink TBFs. This is achieved by including in the uplink control message information on which downlink time slot the concerned TBF is transferred. It is also preferably achieved by including in a downlink control message information on which uplink time slot control information is transferred corresponding to a determined TBF.

Further, the invention can be implemented in GPRS by, for example, introducing a new field, UPLINK_CONTROL_TIMESLOT, while assigning a downlink TBF or reallocating the resources of a downlink TBF in order to inform the MS of which uplink timeslot to use for sending control messages for that particular TBF. In this context, it is also preferable to use the RRBP to specify a single uplink block on the UPLINK_CONTROL_TIMESLOT in which the mobile station shall transmit either a PACKET CONTROL ACKNOWLEDGEMENT message or a PACCH block to the network. (Enphasis added.)

Parentainen is silent with respect to an uplink resource comprising a frequency resource and a spreading code resource.

The Office Action cites Khan '493 as disclosing in paragraph [0040] a generating unit configured to generate transmission power information of the ACK/NACK signal, a modulation unit that modulates the transmission power information, and a transmitting unit that simultaneously transmits the modulated first allocation information, the modulated transmission power information and the modulated second allocation information on a control channel.

Paragraph [0040] of Khan '493 states:

[0040] The non-primary cells (base stations 115) decode (S720) the control channel containing channel quality indicator (CQI) information and a data channel. Based on the CQI information, the base stations 115 in SHO with the mobile station 105 may adjust or modify power of subsequent transmissions, e.g., power at which a HARQ acknowledgment message is transmitted. This is possible because the forward link channel quality information is available prior to the non-serving base stations transmitting (S730) the HARQ acknowledgment signaling message (ACK/NACK) over forward link 107. Since the CQI information is only transmitted with a packet transmission (control channel with data channel carrying the packet), resource efficiency may be improved for transmitting channel quality feedback to multiple cells. There is no need for multiple CQI channels, thereby potentially reducing overhead and interference with other transmissions.

From the above, it is apparent that paragraph [0040] of Khan '493 does not disclose that the CQI is encoded with other control information such as uplink and downlink allocation information. Thus, Khan '493 bears little pertinence to the present claimed invention, and clearly does not cure the above-noted deficiencies of Larsson and Speight.

Li is cited only against dependent claims, and its deficiencies are noted in the previous responses.

Accordingly, the Applicants respectfully submit that the teachings of Larsson, Speight, Parantainen, Khan '493 and Li, even if combined in the manner proposed in the Office Action, still would lack the above-noted features of claim 27 and thus these references, considered individually or in combination, do not render obvious the subject matter now defined by claim 27. Independent claim 30 now similarly recites the above-mentioned subject matter distinguishing apparatus claim 27 from the applied references, but with respect to a method.

Therefore, allowance of claims 27 and 30, and all claims dependent therefrom, is considered to be warranted.

In view of the above, it is submitted that all claims are directed to allowable subject matter and that this application is in condition for allowance. A notice of allowance is respectfully solicited.

If any issues remain that may best be resolved through a telephone communication, the Examiner is requested to telephone the undersigned at the local Washington, D.C. telephone number listed below.

Respectfully submitted,

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